

ABSTRACT

A process for trimming a photoresist layer during the fabrication of a gate electrode in a MOSFET is described. A bilayer stack with a top photoresist layer on a thicker organic underlayer is patternwise exposed with 193 nm or 157 nm radiation to form a feature having a width w_1 in the top layer. A pattern transfer through the underlayer is performed with an anisotropic etch based on H_2/N_2 and SO_2 chemistry. The feature formed in the bilayer stack is trimmed by 10 nm or more to a width w_2 by a $HBr/O_2/Cl_2$ plasma etch. The pattern transfer through an underlying gate layer is performed with a third etch based on $HBr/O_2/Cl_2$ chemistry. The underlayer is stripped by an O_2 ashing with no damage to the gate electrode. Excellent profile control of the gate electrode is achieved and a larger (w_1-w_2) is possible than in prior art methods.